Applied Mathematics II

Prerequisite: Mastery of Elementary Algebra or Applied Mathematics I

Course Description

Applied Mathematics II is targeted but not restricted to students who are working toward technical training or college. Applied Mathematics II contains the same concepts as a traditional geometry course. However, this course uses real-world applications with a strong emphasis on lab activities that engage students in cooperative learning teams. These lab activities are a critical requirement of this course and must be implemented in order to teach for deep understanding rather than at an algorithmic level. This platform allows students to experience concepts in a practical and relevant setting. This course can be taught with the individual CORD Applied Mathematics units (units 27–37) or the hardbound *CORD Geometry* edition published by Globe-Fearon. Upon successful completion of Applied Mathematics II, a student is prepared for Intermediate Algebra.

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Standard 1: Students will acquire number sense and perform operations with real numbers.

There were no new number systems or number operations introduced in Applied Mathematics II.

Standard 2: Students will represent and analyze mathematical situations and properties using patterns, relations, functions, and algebraic symbols.

Objective 2.1: Use patterns, relations, and functions to represent mathematical situations.	Objective 2.2: Evaluate, solve, and analyze mathematical situations using algebraic properties and symbols.	
a. Identify the trigonometric relationships (sine, cosine, tangent), using right triangles, and express these relationships as fractions or decimals. b. Solve problems using the properties of special right triangles, e.g., 30˚, 60˚, 90˚ or 45˚, 45˚, 90˚. c. Recognize the relationship between the length of a side of a triangle and the size of the angle opposite the side. d. Identify the effect on area or volume when changing linear dimensions. e. Analyze geometric patterns to develop formulas and communicate how the formulas were derived, e.g., angle measure and number of sides of a polygon, interior and exterior angles, diagonals, and vertices.	a. Find the angle measure in degrees given the trigonometric ratio using a calculator. b. Find the trigonometric ratio given the angle measure in degrees using a calculator. c. Find unknown measures of right triangles using sine, cosine, and tangent functions and their inverses. d. Solve for corresponding parts of similar figures using proportions. e. Use the geometric mean to solve for unknown segment measures of a right triangle. f. Find the unknown measures of triangles using the Law of Sines or Law of Cosines. g. Write an equation of a line perpendicular or parallel to a line through a given point. h. Solve and model geometric situations using algebraic properties, including equations with two variables.	

Standard 3: Students will solve problems using spatial and logical reasoning, applications of geometric principles, and modeling.

Objective 3.1: Analyze characteristics and properties of two- and three-dimensional shapes and develop mathematical arguments about geometric relationships.	Objective 3.2: Specify locations and describe spatial relationships using coordinate geometry.	Objective 3.3: Use visualization, spatial reasoning, and geometric modeling to solve problems.
a. Write conditional statements, converses, and inverses, and determine the truth value of these statements. b. Prove a statement false by using a counterexample. c. Identify angle pairs as adjacent, complementary, a linear pair, supplementary, or vertical. d. Identify the medians, altitudes, and angle bisectors of a triangle and the perpendicular bisectors of the sides of a triangle. e. When working with circles, identify radii, diameters, chords, secants, arcs, sectors, central angles, inscribed angles, and tangents and their properties. f. Differentiate between parallel, perpendicular, skew, and intersecting lines. g. Prove lines parallel or perpendicular using slope or angle	a. Find the distance between two given points and find the coordinates of the midpoint. b. Solve problems using the distance formula. c. Verify the classifications of geometric figures using coordinate geometry to find lengths and slopes. d. Write the equation of a circle given its graph. e. Graph a circle given the equation in the form $(x - h)^2 + (y - k)^2 = r^2$.	a. Define π as the ratio of the circumference to the diameter of a circle. b. Construct/copy angles and segments, bisect angles and segments, and create perpendicular lines and parallel lines using a compass and straight edge, technology, or other manipulatives. c. Identify, perform, and analyze transformations (translations, rotations, reflections, and dilations) using coordinate geometry. d. Solve real-world problems using geometric properties, the Pythagorean Theorem, trigonometric ratios, and properties of congruent and similar figures, e.g., "How much paint is needed to paint a room?" or "How can we ensure square corners in a building during construction?" e. Sketch cross-sections of geometric solids.

		f. Identify the relationships between the measures of intercepted arcs and inscribed or central angles.
relationships. h. Prove congruency and similarity of geometric figures. i. Classify polyhedrons and other three-dimensional figures by their distinguishing characteristics. j. Classify and use the properties of acute, right, scalene, obtuse, isosceles, equilateral, or equiangular triangles. k. Identify three-dimensional objects from different perspectives using nets, cross-sections, and two-dimensional views. l. Use accepted geometric notations, e.g., congruencies, transformations, similarities. m. Classify a quadrilateral as a parallelogram, trapezoid, rectangle, square, rhombus, kite, or none of the above. n. Classify angle pairs formed by two lines and a transversal, e.g., corresponding, alternate interior, and supplementary angles.		

Standard 4: Students will understand and apply measurement tools, formulas, and techniques.

	Objective 4.2: Determine measurements using appropriate techniques, tools, and formulas. a. Find linear and angle measures using appropriate tools or technology. b. Determine perimeter, area, surface area, lateral area, and volume for prisms, cylinders, pyramids, cones, and spheres given the formulas. c. Find the length of an arc and the area of a sector. d. Find the area of a regular polygon. e. Estimate the area of an irregular region.	

Standard 5: Students will draw conclusions using concepts of probability, after collecting, organizing, and analyzing a data set.

	Objective 5.2: Apply basic concepts of probability. a. Identify geometric probabilities by performing simulations involving length or area. b. Calculate geometric probabilities.	